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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/087,251	02/27/2002	Jered Donald Aasheim	MS1-1070US	4246

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LEE & HAYES PLLC
421 W RIVERSIDE AVENUE SUITE 500
SPOKANE, WA 99201

EXAMINER	
PEIKARI, BEHZAD	
ART UNIT	**PAPER NUMBER**
2189	

DATE MAILED: 06/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/087,251	AASHEIM ET AL.	
	Examiner	Art Unit	
	B. James Peikari	2189	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 February 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7 IDSs*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Examiner's Amendment*.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Lewis Lee (#34,656) on May 23, 2004. On May 27, Mr. Lee emailed the examiner the attached amendments, which the examiner agrees to enter herewith.

The application has been amended as follows:

[SEE ATTACHED]

The examiner believes that, with the exception of the double patenting issue described herewith, the above referenced amendments are neither taught nor suggested by any of the prior art cited by the examiner or by applicant, whether considered alone or in any combination thereof.

BEHZAD JAMES PEIKARI
PRIMARY EXAMINER

CLAIMS

1. **(Once Amended)** In a computer device that uses flash memory to store data, a method comprising:
maintaining one or more mapping data structures containing mappings of logical flash memory addresses to physical flash memory addresses, each mapping data structure having a predetermined capacity ~~of mappings~~;
~~maintaining a master data structure containing a pointer to each of the one or more mapping data structures;~~
allocating additional mapping data structures as needed to provide capacity for additional mappings;
removing one or more additionally allocated mapping data structures if the capacity of mappings is not needed; and
maintaining a master data structure containing a pointer to each of the one or more mapping data structures, wherein the number of pointers changes according to the number of data structures.

2. **(Original)** The method as recited in Claim 1, further comprising adding pointers to the master data structure for the additionally allocated mapping data structures.

3. **(Original)** The method as recited in Claim 1, wherein the mapping data structures and master data structures are generated by a flash driver.

4. **(Once Amended)** The method as recited in Claim 1, wherein the mapping data structures and master data structures are stored in a volatile memory device of the computer device.

5. **(Canceled)**

6. **(Once Amended)** A system for tracking data in a flash medium, comprising:
a secondary data structure containing logical sector address to physical sector address mappings showing a relationship between logical sector addresses, requested by a file system, to physical sector addresses in which associated data is physically stored on the flash medium;
~~a master data structure containing at least one pointer that points to at least one secondary data structure; and~~
means for allocating a third data structure, if the secondary data structure becomes full, wherein the third data structure contains logical sector address to physical sector address mappings and for deallocating the third data structure in the event the secondary data structure is sufficient for mapping physical sector addresses containing data to logical sector addresses; and

a master data structure containing one or more pointers that point to the secondary data structure and the third data structure, if allocated, wherein the number of pointers changes as the third data structure is allocated and de-allocated.

7. **(Canceled)**

8. **(Once Amended)** The system as recited in Claim [[5]] 6, further comprising a flash media driver configured to determine how many physical sectors are contained on the flash medium.

9. **(Once Amended)** The system as recited in Claim [[5]] 6, wherein the means for allocating the third data structure is a flash driver configured to monitor how many logical sector address requests are issued by the file system to ensure there is enough data structure(s) allocated in addition to the secondary data structure.

10. **(Canceled)**

11. **(Once Amended)** The system as recited in Claim [[5]] 6, further comprising means for allocating a fourth data structure, if the second and third ~~tables~~ data structures are full.

12. **(Once Amended)** The system as recited in Claim [[5]] 6, wherein the ~~tables~~ data structures are stored in a volatile memory device.

13. **(Once Amended)** A system, comprising:
a master data structure containing 1 to N pointers, wherein N is an integer greater than 1; ~~and~~
a secondary data structure containing mappings of logical sector addresses to physical sector addresses, the logical sector addresses contained in the secondary data structure being a portion of the maximum possible quantity of logical sector addresses that can be issued by the file system~~, wherein at least one of the pointers in the master data structure points to the secondary data structure~~;
one or more additional data structures containing mappings of logical sector addresses to physical sector addresses, the one or more additional data structures being allocated when the portion of logical sector addresses contained in the secondary data structure is insufficient to store logical sector address write requests issued by the file system and deallocated if the portion of logical sector addresses contained in the secondary data structure becomes sufficient to store the logical sector address write requests issued by the file system; and
wherein the number of pointers in the master data structure changes as the one or more additional data structures are allocated and deallocated.

14. **(Canceled)**

15. **(Canceled)**

16. **(Canceled)**

17. **(Once Amended)** The system as recited in Claim 13, ~~wherein the~~ further comprising a flash driver ~~comprises~~ having a flash abstraction layer configured to monitor logical sector address requests by the file system and update the mappings of logical sector addresses to physical sector addresses.

18. **(Once Amended)** The system as recited in Claim 13, wherein the master and secondary ~~tables~~ data structures are stored in a volatile memory device.

19. **(Once Amended)** The system as recited in Claim 13, wherein the master and secondary ~~tables~~ data structures are stored in a random access device.

20. **(Once Amended)** The system as recited in Claim 13, ~~wherein the~~ further comprising a flash driver ~~comprises a flash media layer,~~ configured to determine a size of ~~the~~ a flash medium.

21. **(Once Amended)** A computer device, comprising:
a flash driver configured to serve as an interface between a file system and the flash memory medium;
a master data structure containing enough pointers to match a maximum quantity of logical sector addresses to be issued by the file system; ~~and~~
a secondary data structure containing mappings of logical sector addresses to physical sector addresses, the logical sector addresses contained in the secondary data structure being a portion of the maximum possible quantity of logical sector addresses to be issued by the file system, wherein ~~each~~ ones of the pointers from the master data structure ~~points~~ point to ~~a~~ specific mappings of logical sector address to physical sector addresses in the secondary data structure; and
one or more additional data structures containing mappings of logical sector addresses to physical sector addresses, allocated by the flash driver when the portion of logical sector addresses contained in the secondary data structure is insufficient to store logical sector address write requests issued by the file system and deallocated by the flash driver if the portion of logical sector addresses contained in the secondary data structure becomes sufficient to store the logical sector address write requests issued by the file system, wherein others of the pointers from the master data structure point to specific mappings of logical sector address to physical sector addresses in the one or more additional data structures, such that the number of pointers in the master data structure pointing to the second and additional data structures varies according to the number of data structures.

22. **(Canceled)**

23. **(Canceled)**

24. **(Canceled)**

25. **(Original)** The computer device as recited in Claim 21, wherein the flash driver comprises a flash abstraction layer configured to monitor logical sector address requests by the file system and update the mappings of logical sector addresses to physical sector addresses.

26. **(Once Amended)** The computer device as recited in Claim 21, wherein the master and secondary ~~tables~~ data structures are stored in a volatile memory device.

27. **(Once Amended)** The computer device as recited in Claim 21, wherein the master and secondary ~~tables~~ data structures are stored in a random access device.

28. **(Once Amended)** The computer device as recited in Claim 21 wherein the computer device is a portable data storage and processing device.

29. **(Once Amended)** In a computer device that uses flash memory to store data, a method comprising:
generating a master data structure containing a plurality of pointers;
allocating a secondary data structure used to map logical sector addresses to physical sector addresses, wherein the secondary data structure is limited in size;
enabling one of the plurality of pointers to point to the secondary data structure;
allocating a third data structure used to map logical sector addresses to physical sector addresses, if the secondary data structure fills-up, and deallocating the third data structure if the second data structure is no longer filled up; and
enabling one of the plurality of pointers to point to the third data structure, if allocated, such that the number of pointers pointing to data structures changes as the third data structure is allocated and deallocated.

30. **(Original)** The method as recited in Claim 29, wherein the logical sector addresses are issued by a file system and the physical sector addresses indicate where data associated with the logical sector addresses is physically stored on the flash medium.

31. **(Original)** The method as recited in Claim 29, further comprising ascertaining a quantity of physical sectors on the flash medium prior to generating the secondary data structure.

32. **(Original)** The method as recited in Claim 29, further comprising ascertaining a quantity of physical sectors on the flash medium prior to generating the secondary data structure and determining an address bit length for the pointers in relation to the quantity of physical sectors ascertained.

33. **(Original)** The method as recited in Claim 29, wherein the secondary data structure is *b*k* bytes in size, wherein *k* is a number of physical sector addresses contained in the data structure and *b* is a number of bytes required to store each physical sector address.

34. **(Original)** One or more computer-readable media comprising computer-executable instructions that, when executed, perform the method as recited in Claim 29.

35. **(Original)** The method as recited in Claim 29, wherein the computer device is portable processing device.

36. **(Original)** The method as recited in Claim 29, wherein the method is performed by a flash driver in conjunction with the file system of the computer device.

37. **(Once Amended)** The method as recited in Claim 29, wherein the ~~tables~~ data structures are stored in a volatile memory portion of the computer device.

38. **(Original)** The method as recited in Claim 29, wherein the secondary data structure fills-up when the logical sector addresses exceed the limited size of the secondary data structure.

39. **(Once Amended)** A computer-readable medium for a Flash driver, comprising computer-executable instructions that, when executed, direct the Flash driver to:
generate a master data structure containing ~~a plurality of~~ one or more pointers;
allocate a secondary data structure used to map logical sector addresses to physical sector addresses, wherein the logical sector addresses are issued by a file system and the physical sector addresses indicate where data associated with the logical sector addresses is physically stored on the flash medium;
~~enable one of the plurality of pointers point to the secondary data structure;~~
allocate a third data structure used to map logical sector addresses to physical sector addresses, if the secondary data structure fills-up, and deallocate the third data structure if the second data structure is no longer filled up; and
enable ~~one of the plurality of pointers point to the third data structure, if allocated~~ pointers from the master data structure to point to the second and third data structures, wherein the number of pointers changes as the third data structure is allocated and deallocated.

40. **(Original)** The computer-readable medium as recited in Claim 39, further comprising computer-executable instructions that, when executed, direct the Flash driver to allocate one or more additional data structures in the event that the third data structure fills-up.

DETAILED ACTION

Drawings

1. The drawings are objected to because the view numbers are not in conformance with 37 CFR 1.84(u)(1). For example, "FIG. 1" should replace "Fig. 1".

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: on page 2, line 12, "implementations" should replace "implementations".

Appropriate correction is required.

3. Applicant's cooperation is requested in correcting any errors, such as the one noted above, of which applicant may become aware in the specification.

Claim Objections

4. Claim 35 is objected to because of the following informalities: "a" should be inserted between "is" and "portable". Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. With the exception of the following, all of the prior deficiencies of the claims under 35 U.S.C. 112, second paragraph, have been corrected by applicant in the amendment attached hereto.

7. Claim 34 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear whether the "One or more computer-readable" media of line 1 is the "device" of the preamble of claim 29 or whether it is another memory altogether. There is confusion because claim 34 has a media (i.e., a device) performing a method of claim 29, wherein claim 29 is a method being performed by a device.

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-40 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-30 of copending Application No. 10/301,800. Although the conflicting claims are not identical, they are not patentably distinct from each other because each and every feature of the

10/301,800 is included in the features of the present claims as filed *and* as amended herewith.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Allowable Subject Matter

10. On May 27, 2005, applicant's representative Lewis Lee (#34,656) also emailed the examiner the following claim:

Claim 41: **(New)** A computer-readable medium for a Flash driver, comprising computer-executable instructions that, when executed, direct the Flash driver to:
maintain one or more mapping data structures containing mappings of logical flash memory addresses to physical flash memory addresses, each mapping data structure having a predetermined capacity;
allocate and deallocate additional mapping data structures as capacity for additional mappings changes; and
maintain a master data structure containing at least one pointer to each of the mapping data structures, wherein the number of pointers changes according to the number of data structures.

This claim contains subject matter distinct from the prior art (but, if entered, would have been subject to the above double patenting rejection). However, this claim must be entered by formal amendment, including any applicable fee(s).

The claims 1-40 have been amended herewith, and thus overcome a rejection that the examiner had been preparing based on Hirota et al., U.S. 6,606,707, (note the description of Figures 18A, 19A, 19C and especially 19B) in view of Robinson, U.S. 5,682,497 (which include the various pointers to mapping data structures, i.e., maps, lacking in Hirota et al.)

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Peikari whose telephone number is (571) 272-4185. The examiner is generally available between 7:00 am and 7:30 pm, EST, Monday through Wednesday, and between 5:30 am and 4:00 pm on Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim, can be reached at (571) 272-4182.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 central hotline at (571) 272-2100.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 746-7239 (Official communications)

or:

(703) 746-7240 (for Informal or Draft communications)

or:

(703) 746-7238 (for After-Final communications)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

B. James Peikari
Primary Examiner
Art Unit 2186

5/30/05